# Gansey Herring Knitting Pattern by Anita Bruce 



## Materials \& Tools

Wool - knitted with 30 g of Guernsey 5ply wool, but adaptable to any thickness Needles - Set of 5 double pointed needles (dpn's) or 40 cm circular needle -2.5 mm (or size to fit wool)
Stuffing - such as wool roving, small quantity

## Skills Required:

Knit, Purl, Increase, Decrease
Knitting in the round
Blind cast on (see tips \& techiques)
Note: the pattern is charted and also written out in full

The 'Gansey Herrings' were created as part of Crafting History, a Creative Collisions programme of craft residencies at the Time and Tide Museum of Great Yarmouth Life. The project was funded by the Heritage Lottery Young Roots.
The 'Gansey Herrings' celebrate the herring industry in Great Yarmouth and the fisher girls who gutted and knitted their way along the coast following the fish. Each has a unique pattern, adapted from either a traditional fisherman's gansey design or a pattern created to reference the collections in the museum and surrounding area. Inspiration for these new patterns ranges from the nets, ropes and baskets used in the fishing industry to a butterfly bomb and off-shore wind farm.
I have released the pattern to the public, in the spirit of the herring girls sharing their stitch patterns along the coast. Feel free to make your own variations on the herring pattern, but please do not reproduce the pattern for commercial use or personal gain.
Although free, if you enjoy this pattern, please consider making a small donation to the Marine Conservation Society in celebration of the silver darling that is the herring at https://www.justgiving.com/fundraising/Anita-Bruce

## Knitting the Gansey Herring

- Blind cast on 4 stitches - see Tips and Techniques for how to do this
- Knitting the head:
- Either follow the written instructions from round 1
- or
- Follow the chart, starting at row 1 stitch 1 in the bottom right hand corner
- Knitting in the round: either use 5 dpn's or a circular needle and magic loop - see Tips and Techniques for how to do this
- When knitting in the round, ignore the grey squares and knit/purl as indicated. Follow each successive round from right to left
- Continue to round 28
- Knitting the body:
- My fish have stuffed heads, not bodies. This is a good point at which to put a little stuffing in the head
- Continue knitting in the round as above
- On reaching round 123 or the end of the chart, stuff the fish if you are going to but don't use too much stuffing!
- Knitting the tail:
- The tail is knitted in k1p1 rib with increases either side of a centre seed stitch
- It then splits and each half is worked separately
- Make the tail larger and longer by adding to the number of increases


## Tips and Techniques

- Blind cast on - the instructions I follow are for 'Judy's Magic Cast On' at http://www.knitty.com/ISSUEspring06/FEATmagiccaston.html
If you find this too tricky, cast on 2 sts and then increase in both of them to get 4sts and continue in the round
- Knitting in the round - this is achieved either with double pointed needles (dpns) or a circular needle using magic loop. I favour magic loop, particularly when knitting the head where there are only a few sts on the needles. Here's a video that explains magic loop http://www.knitty.com/ISSUEss14/FEATss14VT.php although there are plenty of other resources on the web
- Patterns - I have charted the 'Tree of Life' pattern here, a traditional pattern that works well with the shape of the fish and was on one of the gansey's I studied at Time and Tide Museum. I have included an additional chart on the showing small sections of the other patterns I have used, which you could easily adapt
- Contact me on designs@anitabruce.co.uk or via www.anitabruce.tumblr.com


## Gauge:

Will vary according to the weight of yarn used and is not critical.
The chart is 'stitch proportional' so you should end up with an appropriate fish shape regardless of tension.

For your information, my fish were knitted on 2.5 mm needles at a gauge of 36 sts and 48 rows to $10 \mathrm{~cm} \times 10 \mathrm{~cm}$ square using Frangipani 5ply Guernsey wool.

## Abbreviations:

K - Knit
P - Purl
Kfb - knit in front and back (make one)
K2 tog - knit 2 together
Ssk - slip slip knit decrease
S1k1psso - slip 1, knit 1, pass slipped stitch over M1K - pick up horizontal bar between stitch just knitted and the next stitch and knit it M1P - pick up horizontal bar between stitch just knitted and the next stitch and and purl it


## Written Instructions

Chart Gansey Herring - Tree of Life Chart
Round 1: Knit. (4 sts)
Round 2: Kfb x 4. (8 sts)
Round 3: Kfb, k6, kfb. (10 sts)
Round 4: Kfb, k3, kfb x 2, k3, kfb. (14 sts)
Round 5: Knit.
Round 6: Kfb, k12, kfb. (16 sts)
Round 7: K7, kfb x 2, k7. (18 sts)
Round 8: Kfb, k16, kfb. (20 sts)
Round 9: Knit.
Round 10: Kfb, k8, kfb x 2, k8, kfb. (24 sts)
Round 11: Knit.
Round 12: K7, p2, k6, p2, k7.
Round 13: Kfb, k5, p4, k4, p4, k5, kfb. (26 sts)
Round 14: K8, p2, k2, kfb x 2, k2, p2, k8. (28 sts)
Rounds 15-16: Knit.
Round 17: Kfb, k26, kfb. (30 sts)
Rounds 18-19: K2, p, k24, p, k2.
Round 20: K3, p, k22, p, k3.
Round 21: Kfb, k2, p, k10, kfb x 2, k10, p, k2, kfb. (34 sts)
Round 22: (K4, p, k9, p) x 2, k4.
Round 23: K5, p, k7, p, k6, p, k7, p, k5.
Round 24: K5, p8, k8, p8, k5.
Round 25: Kfb, k32, kfb. (36 sts)
Round 26: Knit.
Round 27: K17, kfb x 2, k17. (38 sts)
Round 28: Knit.
Round 29: K9, p, k, p, k14, p, k, p, k9.
Round 30: Kfb, k7, p, k3, p, k12, p, k3, p, k7, kfb. (40 sts)
Round 31: K8, p, k5, p, k10, p, k5, p, k8.
Round 32: K7, p, k2, p, k, p, k2, p, k8, p, k2, p, k, p, k2, p, k7.
Round 33: (K6, p, k2, p, k3, p, k2, p) x 2, k6.
Round 34: (K5, p, k2, p) x 2, k, kfb $\times 2, k,(p, k 2, p$, k5) x 2. (42 sts)
Round 35: (K4, (p, k2) $\times 2, \mathrm{p}, \mathrm{k},(\mathrm{p}, \mathrm{k} 2) \times 2, \mathrm{p}) \times 2$, k4.
Round 36: $(\mathrm{K} 3,(\mathrm{p}, \mathrm{k} 2) \times 2, \mathrm{p}) \times 2$, k 2 , ( $(\mathrm{p}, \mathrm{k} 2) \times 2, \mathrm{p}$, k3) $\times 2$.
Round 37: (K5, p, k2, p) x 2, k6, (p, k2, p, k5) $\times 2$.
Round 38: Repeat round 35.
Round 39: K6, p, k2, p, k3, p, k2, p, k8, p, k2, p, k3, p, k2, p, k6.
Round 40: Repeat round 37.
Round 41: K7, p, k2, p, k, p, k2, p, k10, p, k2, p, k, p, k2, p, k7.
Round 42: Kfb, k5, p, k2, p, k3, p, k2, p, k8, p, k2, p, k3, p, k2, p, k5, kfb. (44 sts)

Round 43: K9, p, k5, p, k12, p, k5, p, k9.
Round 44: K8, p, k2, p, k, p, k2, p, k10, p, k2, p, k, p, k2, p, k8.
Round 45: K10, p, k3, p, k14, p, k3, p, k10.
Round 46: Repeat round 43.
Round 47: K11, p, k, p, k16, p, k, p, k11.
Round 48: Repeat round 45.
Round 49: Knit.
Round 50: Repeat round 47.
Rounds 51-52: Knit.
Round 53: Repeat round 47.
Round 54: Repeat round 45.
Round 55: Repeat round 43.
Round 56: Repeat round 44.
Round 57: K7, p, k2, p, k3, p, k2, p, k8, p, k2, p, k3, p, k2, p, k7.
Round 58: (K6, p, k2, p, k5, p, k2, p) x 2, k6.
Round 59: K5, (p, k2) x 2, p, k, (p, k2) x 2, p, k4, (p, k2) $\times 2, p, k,(p, k 2) \times 2, p, k 5$.
Round 60: Repeat round 57.
Round 61: Repeat round 58.
Round 62: Repeat round 44.
Round 63: Repeat round 57.
Round 64: Repeat round 43.
Round 65: Repeat round 44.
Round 66: Repeat round 45.
Round 67: Repeat round 43.
Round 68: K11, p, k, p, k6, k2tog, ssk, k6, p, k, p, k11.
Round 69: K10, p, k3, p, k12, p, k3, p, k10. (42 sts)
Round 70: Knit.
Round 71: K11, p, k, p, k14, p, k, p, k11.
Rounds 72-73: Knit.
Round 74: Repeat round 71.
Round 75: Ssk, k8, p, k3, p, k12, p, k3, p, k8, k2tog.
Round 76: Repeat round 31. (40 sts)
Round 77: K7, p, k2, p, k, p, k2, p, k2, k2tog, ssk, k2, p, k2, p, k, p, k2, p, k7.
Round 78: K6, p, k2, p, k3, p, k2, p, k4, p, k2, p, k3, p, k2, p, k6. (38 sts)
Round 79: (K5, p, k2, p) x 2, k2, (p, k2, p, k5) $\times 2$.
Round 80: Ssk, (k5, p, k2, p, k, p, k2, p) x 2, k6,
k2tog.
Round 81: K5, p, k2, p, k3, p, k2, p, k4, p, k2, p, k3, p, k2, p, k5. (36 sts)
Round 82: K7, p, k5, p, k8, p, k5, p, k7.
Round 83: (K6, p, k2, p, k, p, k2, p) x 2, k6.
Round 84: Ssk, k6, p, k3, p, k10, p, k3, p, k6, k2tog.
Round 85: K5, p, k5, p, k3, k2tog, ssk, k3, p, k5, p, k5.
Round 86: K8, p, k, p, k10, p, k, p, k8. (32 sts)
Round 87: K7, p, k3, p, k8, p, k3, p, k7.
Round 88: Ssk, k28, k2tog.

Round 89: K7, p, k, p, k10, p, k, p, k7. (30 sts)
Rounds 90-91: Knit.
Round 92: Ssk, k5, p, k, p, k10, p, k, p, k5, k2tog.
Round 93: k5, p, k3, p, k2, k2tog, ssk, k2, p, k3, p, k5 (28 sts)
Round 94: (K4, p, k5, p) x 2, k4. (26 sts)
Round 95: K3, p, k2, p, k, (p, k2) x 3, p, k, p, k2, p, k3.
Round 96: Ssk, p, k2, p, k3, p, k2, p2, k2, p, k3, p, k2, p, k2tog.
Round 97: K3, p, k5, p, k4, p, k5, p, k3. (24 sts)
Round 98: ((K2, p) x 2, k, p, k2, p) x 2, k2.
Round 99: K4, p, k3, p, k6, p, k3, p, k4.
Round 100: Ssk, k, p, k5, p, k4, p, k5, p, k, k2tog.
Round 101: K4, p, k, p, k2, k2tog, ssk, k2, p, k, p, k4. (22 sts)
Round 102: (K3, p) x 2, k4, (p, k3) x 2. (20 sts)
Round 103: Knit.
Round 104: K4, p, k, p, k6, p, k, p, k4.
Rounds 105-106: Knit.
Round 107: Ssk, k2, p, k, p, k6, p, k, p, k2, k2tog.
Round 108: K2, p, k3, p, k4, p, k3, p, k2. (18 sts)
Round 109: k, p, k5, p2tog, p2tpg, k5, p, k.
Round 110: K3, p, k, p, k4, p, k, p, k3. (16 sts)
Round 111: (K2, p, k3, p) x 2, k2.
Round 112: Knit.
Round 113: Repeat round 110.
Round 114: Knit.
Round 115: K7, k2tog, ssk, k7.
Rounds 116-123: Knit. (14 sts)

## Knitting the tail:

The tail is knitted in k 1 p 1 rib
Line up the two needles in parallel and knit 1 stitch from the front needle and one from the back needle in turn (14sts). I use a spare dpn for this.


Row 1: K2tog, p2tog alternately across row (7sts) this joins the front and back of the body together. From now on, the tail is knitted straight rather than in the round

Row 2 and all even rows: p1 k1 rib across the row Row 3: k1, p1, k1, m1p, p1, m1p, k1, p1 ,k1 (9sts) Row 5: k1, p1, k1, p1, m1k, p1, m1k, p1, k1, p1, k1 (11sts)
Row 7: k1, p1, k1, p1, k1, m1p , p1, m1p, k1, p1, k1, p1, k1 (13sts)
Row 9: k1, p1, k1, p1, k1, p1, m1k, p1, m1k, p1, k1, p1, k1, p1, k1 (15sts)
Row 11: k1, p1, k1, p1, k1, p1, k1, s1k1psso, p1, k1, p1, k1, p1, k1 (14sts)

Turn work as usual and work only on 1 st 7 sts,
Row 12: p1, k1, p1, k1, p1, k2tog (6sts)
Row 13: k2 tog, p1, k1, p1, k1 (5sts)
Row 14: p1, k1, p1, k2 tog (4sts)
Row 15: k2 tog, p1, k1 (3sts)
Row 16: Cast off 3 sts

Leave a length of yarn around 2 feet long Use a tapestry needle to run yarn along inside edge of tail fin and rejoin to centre st ready to knit the other half of tail


Repeat rows 12-16, to work the other half of the tail fin
Decrease stitches on the inside of the tail to match the first side. After casting off remaining stitches, use the tapestry needle to run yarn along the centre of the tail and bury in the body of the fish


## Acknowledgement

Thanks and gratitude to Jan Whitehead of the Lowestoft Gansey Project for corrections to the written instructions in Version 4

Additional Pattern Ideas:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  | $\bullet$ |  |  |  |  |  | - | - |  |  |  |  |  | $\bullet$ | - |  |  |  |  |  |  | - | - |  | - | - | - | - |  | - | - | - | - |  | $\bullet$ | - | - | - |  |
|  |  |  |  |  |  | - | - |  |  |  |  |  | - | - |  |  |  |  |  | $\bullet$ | - |  |  |  |  |  |  | $\bullet$ | - |  |  | - | - | - |  |  | - | - |  |  |  | - | - |  |  |
|  |  |  |  |  | - |  | - | - |  |  |  |  |  | - | - |  |  |  |  | - |  | - |  |  |  |  | - |  |  |  |  |  | - |  |  |  |  | - |  |  |  |  |  |  |  |
|  |  |  |  | - | - - | - | - |  | - |  |  |  |  | - | $\bullet$ |  |  |  | - |  |  | - |  |  |  |  | - |  |  |  |  |  |  | - |  | - | - |  | - | - | - | - |  |  |  |
|  |  |  |  | $\bullet$ | - |  | - | - | - |  |  |  | - | - |  | $\bullet$ | - | - |  |  |  |  | - |  | - | - |  | - | - |  |  |  |  |  |  | - |  |  |  | - | - |  |  |  |  |
|  |  |  | - |  |  | - | - |  |  | $\bullet$ |  |  | - | - |  | $\bullet$ | - |  |  |  |  |  |  | - | - | - |  | - | - |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |
|  |  | - |  |  |  |  | - |  |  |  | - |  |  | - | - |  |  |  |  | - | - |  |  |  |  |  | - |  |  |  | - | - | - | - |  | - | - | - | - |  | - | - | - | - |  |
|  | - |  |  |  |  |  |  |  |  |  | - |  |  | - | - |  |  |  |  | $\bullet$ | - |  |  |  |  |  | - |  |  |  |  | - | - | - |  |  | - | - |  |  |  | - | - |  |  |
|  |  |  |  |  |  |  | - |  |  |  |  |  | - | - |  |  |  |  |  | - |  | - |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  | - |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | - | - |  |  |  |  | - |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | - | - |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | - | - |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  | $\bullet$ |  |  | - | - | - | - | - | - | - | - |  | - | - | - | - | - | - | - | - |  |  |
|  |  |  |  |  | - | - | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | - | - - | - | - |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | - | - | - | - | - | - |  | - | - | - | - | - | - | - | - |  |  |
|  |  |  |  | $\bullet$ | - | - | - | - | - |  |  |  |  | - |  |  |  | - |  |  |  | - |  |  |  |  |  |  |  |  | - |  |  | - |  | - |  |  |  |  | - |  | - |  |  |
|  |  |  | - |  |  | - | - |  |  | - |  |  |  | - |  |  |  | $\bullet$ |  |  |  | $\bullet$ |  |  |  |  |  |  |  | - |  |  | $\bullet$ |  |  |  |  | - |  | - |  |  |  |  |  |
|  |  | - |  |  |  | - | - |  |  |  | $\bullet$ |  |  | - | - |  |  | $\bullet$ | - |  |  | - |  |  |  |  |  |  |  | - |  | - |  |  |  |  | - |  | - |  |  | - |  |  |  |
|  | - |  |  |  |  |  |  |  |  |  | - |  |  | - | - |  |  | - | $\bullet$ |  |  | - |  |  |  |  |  |  | - |  | $\bullet$ |  |  | - |  | - |  |  |  |  | - |  |  |  |  |
|  |  |  |  |  |  |  | - |  |  |  |  |  |  |  | - | - |  |  | $\bullet$ | - |  | - | - |  |  |  |  | - |  | - |  |  | $\bullet$ |  |  |  |  | - |  | - |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\bullet$ | $\bullet$ |  |  | - | - |  | - | - |  |  |  | $\bullet$ |  |  | - |  | - |  |  |  |  | - |  | $\bullet$ |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\bullet$ |  |  |  | - |  |  | - | - |  |  |  |  | - |  | $\bullet$ |  |  | - |  | - |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | - | - |  |  |  |  |  |  |  |  | $\bullet$ | $\bullet$ |  |  | - |  |  | - | - |  |  | - |  |  | - |  | - |  |  |  |  | - |  | - |  |  |  |  |  |  |
|  |  |  |  |  |  | - | - |  |  |  |  |  |  |  |  |  | - - |  |  | $\bullet$ | - |  |  | - | - |  |  | - |  |  |  |  | - |  |  |  |  | - |  | $\bullet$ |  |  |  |  |  |
|  |  |  |  |  | - |  |  | - |  |  |  |  |  |  |  |  | - - |  |  | - | - |  |  | - | - |  |  |  | $\bullet$ |  | - |  |  | - |  | - |  |  |  |  | - |  |  |  |  |
|  |  |  |  | - | - |  | - |  | - |  |  |  |  |  |  |  | $\bullet$ | - |  |  | - | - |  |  | $\bullet$ | - |  |  |  | - |  | - |  |  |  |  | - |  | - |  |  | - |  |  |  |
|  |  |  |  | - |  | - | $\bullet$ |  | - |  |  |  |  |  |  |  | - | $\bullet$ |  |  | - | - |  |  | $\bullet$ | - |  |  |  | - |  |  | - |  |  |  |  | - |  | - |  |  |  |  |  |
|  |  |  | - |  | - |  |  | - |  | - |  |  |  |  |  |  | - - |  |  | - | - |  |  | - | $\bullet$ |  |  |  |  |  | - |  |  | - |  | - |  |  |  |  | - |  | - |  |  |
|  |  | - |  | - | - |  |  |  | - |  | - |  |  |  |  |  | - - |  |  | - | - |  |  | $\bullet$ | - |  | - | - | - | - | $\bullet$ | - | - | - | - | - | - | - | - | - | - | - | - |  |  |
|  | - |  |  | $\bullet$ |  |  |  |  | - |  | - | - |  |  |  | - | - |  |  | - |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| - |  |  | - | - | - |  |  |  | - | - |  | - |  |  |  | $\bullet$ | $\bullet$ |  |  | - - |  |  | - | $\bullet$ |  |  | - | - | - | - | , | - | - | - |  | - | - | - | - | - | - | - | - |  |  |
|  |  | - |  |  | - |  |  | - |  |  | - |  |  |  | - | - |  |  | - | - |  | - | - |  |  |  | - |  |  |  | - |  |  |  |  |  |  |  | - |  |  |  |  |  |  |
|  | - |  |  |  |  | - | - |  |  |  | - | - |  |  | - | - |  |  | $\bullet$ | - |  | - | - |  |  |  |  | - |  | - |  | - |  |  |  | - |  |  |  | - |  |  |  |  |  |
| - |  |  |  |  |  | - | - |  |  |  |  | - |  | - | - |  |  | $\bullet$ | - |  |  | - |  |  |  |  |  |  | - | - |  |  | - |  |  |  | - |  |  |  | - |  |  |  |  |
|  | - |  |  |  |  | - | - |  |  |  | - |  |  | - | - |  |  | $\bullet$ | - |  |  | - - |  |  |  |  |  |  |  | - |  |  |  | - |  |  |  | - |  |  |  | - |  |  |  |
|  |  | - |  |  | - |  |  | - |  | - | - |  |  | - |  |  | - | - |  |  |  | $\bullet$ |  |  |  |  |  |  | - |  |  |  | - |  |  |  | - |  |  |  | - |  |  |  |  |
|  |  |  | - | - | - |  |  |  | - | $\bullet$ |  |  |  | - - |  |  | - | - |  |  | - | - |  |  |  |  |  | - |  | - |  | - |  |  |  | - |  |  |  | - |  |  |  |  |  |
|  |  |  |  | $\bullet$ |  |  |  |  | - |  |  |  |  | - | - |  |  | - | - |  | - | - |  |  |  |  | - |  |  | - | - |  |  |  |  |  |  |  | - |  |  |  |  |  |  |
|  |  |  | - | $\bullet$ | - |  |  |  | - | - |  |  |  | - | - |  |  | $\bullet$ | - |  |  | - |  |  |  |  |  | - |  | - |  | - |  |  |  | - |  |  |  | - |  |  |  |  |  |
|  |  | - |  |  | - |  |  | - |  |  | - |  |  |  | - | - |  |  | $\bullet$ | - |  | - | - |  |  |  |  |  | - |  |  |  | - |  |  |  | - |  |  |  | - |  |  |  |  |
|  | - |  |  |  |  | - | - |  |  |  | - |  |  |  | - | - |  |  | $\bullet$ | - |  | - | - |  |  |  |  |  |  | - |  |  |  | - |  |  |  | - |  |  |  | - |  |  |  |
| - |  |  |  |  |  |  | - |  |  |  |  | - |  |  |  | $\bullet$ | - |  |  | - $\bullet$ |  |  | - | - |  |  |  |  | - |  |  |  | - |  |  |  | $\bullet$ |  |  |  | - |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\bullet$ | $\bullet$ |  |  | - |  |  | - | - |  |  |  | - |  | - |  | - |  |  |  | - |  |  |  | - |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  |  | - | - |  |  | $\bullet$ | - |  | - |  |  |  | - |  |  |  |  |  |  |  | - |  |  |  |  |  |  |
|  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  | - |  |  | - | - |  |  | - | - |  |  | - |  |  |  | - |  |  |  | - |  |  |  | - |  |  |  |  |  |
|  |  |  |  |  |  | - - | - - |  |  |  |  |  |  |  |  |  | - | - |  |  | - | - |  |  | - | - |  |  | - |  |  |  | - |  |  |  | $\bullet$ |  |  |  | - |  |  |  |  |
|  |  |  |  |  | - |  | - | - |  |  |  |  |  |  |  |  | - | - |  |  | - | $\bullet$ |  |  | - | - |  |  |  | - |  |  |  | - |  |  |  | - |  |  |  | - |  |  |  |
|  |  |  |  | - | - |  | $\bullet$ |  | $\bullet$ |  |  |  |  |  |  |  | - |  |  | - | - |  |  | $\bullet$ | - |  |  |  | - | - |  |  | $\bullet$ |  |  |  | - |  |  |  | - |  |  |  |  |
|  |  |  |  | - |  |  | $\bullet$ |  | - |  |  |  |  |  |  |  | - - |  |  | - | - |  |  | $\bullet$ | $\bullet$ |  |  | - |  | - |  | - |  |  |  | - |  |  |  | - |  |  |  |  |  |
|  |  |  | $\bullet$ |  |  | - - | - - |  |  | - |  |  |  |  |  |  | $\bullet$ |  |  | - |  |  |  | $\bullet$ |  |  | - |  |  | - | - |  |  |  |  |  |  |  | - |  |  |  |  |  |  |
|  |  | - |  |  | - |  | - | - |  |  | - |  |  |  |  |  | $\bullet$ |  |  | $\bullet$ |  |  |  | $\bullet$ |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\bullet$ |  | - | - |  | - |  | - |  | $\bullet$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | - |  | - | - - |  | - |  |  |  |  |  |  |  |  | - | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | - |  |  | - | $\bullet$ |  |  | - |  |  |  |  |  |  | - | - |  | - |  |  |  |  |  |  |  |  |  |  |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  | - |  |  | - |  | - | - |  |  | - |  |  |  |  |  | - | - | - | - |  |  |  |  |  |  |  |  |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\bullet$ |  | - | - |  | $\bullet$ |  | - |  | $\bullet$ |  |  |  |  | $\bullet$ | - | - |  | - |  |  |  |  |  |  |  |  |  | - |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | - |  |  | - - |  | - |  |  |  |  |  | - | $\bullet$ | - | - | - | - |  |  |  |  |  |  |  | - | - |  | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | - |  |  | - | - |  |  | - |  |  |  |  | - |  |  | - |  | - |  |  |  |  |  |  | - |  |  | - |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  | - |  |  | - |  |  | - |  |  | $\bullet$ |  |  |  | - | $\bullet$ |  | - | - | - |  |  |  |  |  |  |  | - | - |  | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\bullet$ |  | - |  |  |  | - |  |  | $\bullet$ |  |  |  |  |  |  | $\bullet$ |  | - |  |  |  |  |  |  |  |  |  | - |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | - |  |  | - |  |  |  |  |  |  |  |  |  | - | - | - | - |  |  |  |  |  |  |  |  |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | - |  |  | $\bullet$ |  |  |  | - |  |  |  |  |  |  | $\bullet \cdot$ | $\bullet$ |  | - |  |  |  |  |  |  |  |  |  |  |  |  | $\bullet$ | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | - |  |  | $\bullet$ |  |  | $\bullet$ |  |  |  |  | $\bullet$ | $\bullet \cdot$ | $\bullet$ | - | $\bullet$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | $\bullet$ |  | - | - |  | - |  |  |  | $\bullet$ |  |  |  | $\bullet$ | $\bullet$ | $\bullet \cdot$ | $\bullet$ |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | - ${ }^{-}$ | - |  |  | - | $\stackrel{\square}{-}$ |  |  |  |  |  |  | $\cdots$ | $\bullet$ | $\bullet \cdot$ | - | $\bullet$ | $\bullet$ |  |  |  |  |  |  |  |  |  |  |  |  | $\bullet$ | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  | - |  |  | - |  |  |  |  |  | - |  |  | - - | - | - | - | $\cdots$ |  | - |  |  |  |  |  |  |  |  |  | - | - | - | - | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  | - |  | - |  |  |  |  |  |  | - |  |  |  |  |  |  | - |  | - |  |  |  |  |  |  |  | - | - |  | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - | - |  |  |  |  |  |  | - |  |  | - |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  | $\bullet$ | - | - |  | - |  |  |  |  |  |  |  | - | - |  | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | $\bullet$ | - | - | - | - |  |  |  |  |  |  |  |  |  | - |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | - |  |  |  |  |  |  | - | - | - | - | - |  | - |  |  |  |  |  |  |  |  |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | - |  |  |  |  |  |  | - - | - | - | - | - | - | - |  |  |  |  |  |  |  |  |  |  |  |  | - | - |  | - |  |  |  |  |  |  |  |  |  |
|  |  |  | - |  |  |  |  | - |  |  |  |  |  |  |  |  |  | - |  | $\bullet$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | - - | - - | - - | - - |  | - - | - |  |  |  |  |  |  | - | - | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | - |  |  |  |  | - |  |  |  |  |  |  |  |  | - - | - |  | - |  |  |  |  |  |  |  |  |  |  |  |  | $\bullet$ | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  | $\bullet$ | - | - | - | - |  |  |  |  |  |  |  |  |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | $\bullet$ |  |  |  |  |  |  |  | - | - | - | - |  | - |  |  |  |  |  |  |  |  |  | - |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | - |  |  |  |  |  | - | - | - | - | - | - | - |  |  |  |  |  |  |  | - | - |  | - | - |  |  |  | - |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  | $\bullet$ |  |  |  |  | - - | - | - | - | - |  | $\bullet$ |  |  |  |  |  |  | - |  |  | - |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | - | - |  |  |  | - |  |  |  |  |  |  |  |  | - | - | - |  |  |  |  |  |  |  | - | - |  | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | - - | - - | - - | - - | - | - | - - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | - | - |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - | - |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | - |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | - |  |  |  |  |  | - |  |  |  |  |  | - | - |  |  | - |  |  |  |  |  |  |  |  |  | - |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | - - | - - | - - | - - | - | - | - - |  |  |  | - |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  | - |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | - |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  | - |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | - |  |  |  |  | - |  |  |  |  |  |  |  | - |  |  | - | - |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | - |  |  |  |  | - |  | - - | - | - - | - |  | - | - |  | - |  |  |  | - |  | - | - | - | - | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  | - |  |  | - | - |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  | - |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  | - |  |  |  | $\bullet$ |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | $\bullet$ | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | - |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

